

# RUBELLA

**Also known as German Measles or Three-Day measles**

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**Responsibilities:**

**Hospital:** Report by IDSS, mail, facsimile or phone

**Lab:** Report by IDSS, mail, facsimile, or phone

**Physician:** Report by mail, facsimile, or phone

**Local Public Health Agency (LPHA):** Report by IDSS, mail, facsimile or phone.

**Follow-up required.**

**Iowa Department of Public Health**

**Disease Reporting Hotline: (800) 362-2736**

**Secure Fax: (515) 281-5698**

## 1) THE DISEASE AND ITS EPIDEMIOLOGY

### A. Etiologic Agent

Rubella is caused by rubella virus (genus *Rubivirus*, family *Togaviridae*).

### B. Clinical Description

When contracted after birth, rubella is usually a mild disease characterized by a generalized maculopapular rash, swollen lymph nodes, and slight fever. Transient inflammation of the joints rarely occurs in children, but is common in adolescents and adults, especially women (up to 70%). Encephalitis occurs (1 per 5,000 cases, more frequently in women) and hemorrhagic manifestations (1 per 3,000 cases, more often in children) are rare complications. Up to 50% of infections occur without recognized rash.

Rubella is of greatest danger to the fetus. Up to 90% of infants born to mothers infected in the first trimester will develop the physical anomalies referred to as congenital rubella syndrome (CRS). CRS is characterized by complications, which include blindness, heart defects, deafness, behavioral disorders, mental retardation, growth retardation, bone disease, enlarged liver and spleen, thrombocytopenia, and purple skin lesions. Some effects may not be apparent at birth.

Reinfection has been demonstrated on rare occasions, but only very rarely has resulted in CRS.

### Clinical Case Definition

- Acute onset of generalized maculopapular rash
- Temperature  $>37.2^{\circ}\text{C}$  ( $99^{\circ}\text{F}$ ), if measured
- Arthralgia/arthritis, or lymphadenopathy, or conjunctivitis
- Serologic confirmation (IgM or 4-fold increase in IgG)

Clinical diagnosis is UNRELIABLE. Serologic confirmation is critical.

### Case Classifications

Suspected. A case of any generalized rash illness of acute onset.

Probable. A case that meets the clinical case definition, has noncontributory or no serologic or virologic testing, and is not epidemiologically linked to a laboratory confirmed case.

Confirmed. A case that is laboratory confirmed or that meets the clinical case definition and is epidemiologically linked to a laboratory confirmed case.

**C. Reservoirs**

Humans are the only known host.

**D. Modes of Transmission**

Rubella is transmitted person-to-person by droplet or direct contact with the nasopharyngeal secretions of an infected person or with the nasopharyngeal secretions or urine of an infant with CRS.

**E. Incubation Period**

The incubation period is usually 14 -17 days, with a range of 14–21 days.

**F. Period of Communicability or Infectious Period**

The infectious period is usually from 7 days before to at least 4 days after rash onset. Infants with CRS shed virus in nasopharyngeal secretions and urine for a longer period; a small proportion of them continue to be infectious for 1 year or more.

**G. Epidemiology**

Rubella occurs worldwide. In the temperate zones, peak incidence is in late winter and early spring. Before the widespread use of rubella vaccine, which was licensed in 1969, peaks of rubella incidence occurred in the United States every 6–9 years, and most cases occurred in children. Now that children are well immunized, most cases have occurred in young, unvaccinated adults in college and occupational settings. Recent serologic surveys indicate that about 10% of young adults are susceptible to rubella.

In recent years in the U.S. and Iowa, outbreaks have occurred among immigrant populations due to lack of rubella vaccination programs in their countries of origin. Outbreaks occur predominately in workplaces and communities at large. CRS disproportionately affects infants born to foreign-born women. The last case of Rubella reported in Iowa was in 2001.

**H. Bioterrorism Potential**

None.

## **2) DISEASE REPORTING AND CASE INVESTIGATION**

**A. Purpose of surveillance and reporting**

- To identify all cases and susceptible exposed people and to prevent further spread of infection, especially to pregnant women.
- To ensure appropriate management of exposed pregnant women and their babies.
- To monitor the effectiveness of outbreak control strategies.
- To identify cases of congenital rubella infection or syndrome that may occur after a cluster or outbreak of rubella.

**B. Laboratory and Healthcare Provider Reporting Requirement**

Iowa Administrative Code 641-1.3(139) stipulates that the laboratory and the healthcare provider must report. The preferred method of reporting is by utilizing the Iowa Disease Surveillance System (IDSS). However, if IDSS is not available to your facility the reporting number for IDPH Center for Acute Disease Epidemiology (CADE) is (800) 362-2736; fax number (515) 281-5698, mailing address:

IDPH, CADE  
Lucas State Office Building, 5<sup>th</sup> Floor  
321 E. 12<sup>th</sup> St.  
Des Moines, IA 50319-0075

Postage-paid disease reporting forms are available free of charge from the IDPH clearinghouse. Call (319) 398-5133 or visit the website: [healthclearhouse.drugfreeinfo.org/cart.php?target=category&category\\_id=295](http://healthclearhouse.drugfreeinfo.org/cart.php?target=category&category_id=295) to request a supply.

### What to Report to the Iowa Department of Public Health

- A case of rash illness accompanied by fever, or
- A suspect case of rubella (with or without fever), as diagnosed by a healthcare provider; **or**
- Positive serologic test for rubella IgM; or
- Significant rise between acute and convalescent phase titers in serum rubella IgG *or* total antibody level by any standard serologic assay; or
- Isolation of rubella virus from a clinical specimen.
- A suspect or confirmed case of congenital rubella syndrome (CRS) in a child (usually a baby), as diagnosed by a healthcare provider (the CRS case definition appears under "Additional Information" at the end of this chapter).

### Laboratory Services Available

#### 1. Serologic Testing for Non-Congenital Rubella

- **Rubella IgM test:** False positive rubella IgM results can occur in persons with parvovirus infection, infectious mononucleosis, or rheumatologic disease. IDPH recommends submission of specimens to the State Hygienic Laboratory (SHL) for testing. The specimen should be drawn **NO** earlier than 3 days after onset of rash, to minimize the possibility of false negative results. It can be drawn as late as 6 weeks after the onset of the rash. (If serum is collected prior to the third day and tests are negative, a follow-up specimen may be requested.).
- **Rubella total antibody paired-titer test:** Testing for rubella IgM is greatly preferred because it provides an earlier result. However, SHL also performs a paired titer test. Acute serum (IgM) should be collected 7-10 days after onset of rash. Convalescent serum (IgG) should be collected 14 days later.
- **Shipment of sera:** SHL will conduct the IgM testing for rubella and measles at no charge. Please request IgM testing for measles and rubella. Contact the virus-serology laboratory at (319) 335-4277. Transport via courier may be arranged, if possible.
- If sera must be shipped, send it overnight by Federal Express to the following address:

**State Hygienic Laboratory  
Virus-Serology Laboratory  
102 Oakdale Campus, #H101 OH  
Iowa City, IA 52242-5002**

- For more information, visit: [www.shl.uiowa.edu/](http://www.shl.uiowa.edu/)

### C. Local Public Health Agency Roles and Control Measure Responsibilities

1. Implement control measures before serologic confirmation. This is especially important in settings involving pregnant women (obstetric-gynecologic and prenatal clinics).
2. Isolate case during infectious period as defined above.
  - The individual must stay home during infectious period; if hospitalized, the patient must be placed in droplet isolation for seven days after the onset of rash.

- For congenital rubella, place infant in Contact Precautions during any admission until 1 year old, unless nasopharyngeal and urine cultures are negative for virus after the age of 3 months.
- 3. In order to identify those exposed, identify “zones of exposure” such as place of work (including sites which employ individuals from other countries where rubella is prevalent), school, family, child care, etc.
- 4. Identify high-risk susceptibles that the index case has had contact with during infectious period.
  - Immunocompromised individuals should be referred to their physicians.
- 5. Identify susceptibles. These are individuals without proof of immunity.

<b>PROOF OF IMMUNITY TO RUBELLA<sup>1</sup></b>
<ul style="list-style-type: none"> <li>• Documentation of rubella vaccination on or after the first birthday, <b>unless</b> pregnant.</li> <li>• Serologic proof of immunity.<sup>2</sup></li> </ul>
<p><sup>1</sup> Remember, persons born outside the US (without written proof of immunity) are more likely to be susceptible, especially if they have been in the US for only a short time.</p> <p><sup>2</sup> <b>Documentation of serologic evidence of immunity is the only acceptable proof of immunity for pregnant women.</b></p>

Physician-diagnosed disease or born before 1957 is not acceptable proof of immunity.

- 6. Immunize all susceptibles for whom it is not contraindicated, keeping in mind the following:
  - Rubella containing vaccine will not prevent development of disease after infection.
  - Vaccinating an individual who may be incubating rubella is not harmful.
- 7. Child care and school settings:
  - Determine if there are any susceptible:
    - a. Pregnant teachers, staff, volunteers, student teachers, or students.
    - b. Immunocompromised individuals.
    - c. Medical/religious vaccine exemptions anywhere in the classroom or school of the suspected case.
  - These individuals, if medically appropriate, should be encouraged to receive vaccine and may self exclude during the time frames described above.

#### **D. Initial Questions to Ask Healthcare Provider and Patient**

In order to assess the likelihood that a suspect case is a true case prior to laboratory testing, IDPH and/or LPHA staff conducting the investigation should ask about:

- Symptoms
- Rubella immunization history
- Country of origin and length of residence in US
- Recent travel history (location and dates)
- Whether there were any recent out-of-town visitors location and dates)
- Whether there was any recent contact with anyone with similar symptoms

## **2) CONTROLLING FURTHER SPREAD**

### **A. Isolation and Quarantine Requirements**

Current recommendations of CDC and IDPH are as follows:

#### **Non-congenital rubella:**

Minimum Period of Isolation of Patient

7 days after onset of rash.

### Minimum Period of Quarantine of Contact

Healthcare workers who are not appropriately immunized or do not have serologic evidence of immunity will be excluded from work from day 7 through day 21 after their last exposure. When multiple cases occur, susceptibles need to be excluded until 21 days after the onset of the last case at the workplace.

### Congenital rubella:

Minimum Period of Isolation of Patient

Isolation from susceptible persons for the first year of life or until two cultures of clinical specimens (nasopharyngeal secretions or urine) obtained 1 month apart after 3 months old are negative for rubella virus. Household and other contacts should be adequately immunized.

### Minimum Period of Quarantine of Contacts

No restrictions except for susceptibles. Same as for non-congenital rubella, above.

## B. Protection of Contacts of a case

## C. Managing Special Situations

Control guidelines for three situations ---**1)** rubella in healthcare facilities, **2)** when a pregnant woman has been exposed, and **3)** infants with CRS—are presented below. Note that these situations are not mutually exclusive.

### Situation 1: Rubella in healthcare facilities

If a confirmed or suspect case of rubella has visited a healthcare facility during his/her infectious period, contact the infection prevention staff and go over the following recommendations with them:

1. **Identify all susceptible high-risk patients, volunteers and staff exposed to the rubella case.** Pregnant women and immunosuppressed individuals should be referred to their healthcare providers to determine if they are immune.  
**Pregnancy and Immune Globulin.** Routine use of IG for postexposure prophylaxis is not recommended, even for susceptible pregnant women, because IG does not guarantee prevention of fetal infection. The only time IG may be considered is when exposure occurs early in pregnancy and termination is not an option.
2. **Identify all other susceptible exposed patients and staff at the facility.** Primary care providers of exposed infants should be notified. Proof of immunity is defined as:

PROOF OF IMMUNITY TO RUBELLA <sup>1</sup>
<ul style="list-style-type: none"> <li>• Documentation of rubella vaccination on or after the first birthday,</li> <li>• Serologic proof of immunity.<sup>2</sup></li> </ul>
<p><sup>1</sup> Remember, persons born outside the US (without written proof of immunity) are more likely to be susceptible, especially if they have been in the US for only a short time.</p> <p><sup>2</sup> Documentation of <b>serologic evidence of immunity is the only acceptable proof of immunity for pregnant women.</b></p>

3. **Notify healthcare providers of all exposed patients.**
4. **Immunize all susceptible patients and staff.** Live-virus rubella vaccine given after exposure has not been demonstrated to prevent illness, but theoretically could prevent illness if administered within 3 days of exposure. All susceptibles who are  $\geq 12$  months old (and for whom it is not contraindicated) should receive rubella vaccine given as the combined formulation of measles, mumps, rubella (MMR) vaccine.

Previous administration of human anti-Rho(D) immune globulin (RhoGam) does not generally interfere with an immune response to rubella vaccine. However, women who have received anti-Rho immune globulin should be serologically tested 6–8 weeks after vaccination to assure that seroconversion occurred. If other antibody-containing blood products are needed for other reasons, they should be administered at least 2 weeks before and deferred for up to 11 months after administration of MMR vaccine. (Refer to General Recommendations on Vaccination at: [www.cdc.gov/vaccines/hcp/acip-recs/index.html](http://www.cdc.gov/vaccines/hcp/acip-recs/index.html))

5. **Exclude susceptible staff.** Ideally, all hospital employees should be immune. It is important to note that screening programs alone are not adequate. Vaccination of susceptible hospital personnel, both male and female (e.g., volunteers, trainees, nurses, physicians) must follow. Unlike measles, vaccinating immediately postexposure does not prevent an individual from acquiring rubella. Therefore, all susceptible individuals without proof of immunity, including those just vaccinated, can become infectious and must be excluded on days 7 through 21 postexposure. They may return on the 22<sup>nd</sup> day. If additional cases occur, the exclusion period may need to be extended.
6. **Isolate susceptible patients and suspect/confirmed cases.** Susceptible patients  $\geq 12$  months of age should be vaccinated and placed on Droplet Precautions for days 7–21 after exposure. They may be taken off precautions on the 22<sup>nd</sup> day. All suspect and confirmed cases should be placed on Droplet Precautions during their infectious period. The infectious period for rubella is 7 days before rash onset through 7 days after rash onset.
7. **Conduct surveillance** for two incubation periods (46 days) after the last exposure in the facility, and report all suspect cases of rubella to the Iowa Department of Public Health at (800) 362-2736.
8. **Place any new cases of rash illness on Droplet Precautions or exclude for 7 days after rash onset.** A blood specimen should be obtained 3 days after rash onset and sent to SHL. New cases should be **reported** to the Iowa Department of Public Health.

### Situation 2: Pregnant women who might have been exposed to Rubella

All exposed pregnant women should be screened to determine if they:

1. were infected during pregnancy,
2. are susceptible or
3. were immune before pregnancy.

Because of the seriousness of CRI, immunity must be documented by a verified, dated record of a positive serologic test. Pregnant women without documented immunity should be tested for the presence of rubella IgG and IgM antibodies as outlined in this section. Identifying susceptible pregnant women is critical, so they can be isolated from further exposure, monitored for infection, and vaccinated postpartum. Pregnant women with evidence of infection during pregnancy should be evaluated to verify rubella infection and determine gestational age at time of infection, if possible, to assess the possibility of risk to the fetus.

*Regardless* of the point in pregnancy in which the exposure occurred (because of the possibility of late effects), and *regardless* of whether the woman had symptoms of rubella (because of the high proportion of asymptomatic infections). Diagnostic testing of the baby will be necessary if rubella infection in the mother was not reliably ruled out, as reflected below:

Possible conclusions	Pregnant woman's lab results		
	Rubella IgM-neg. and no rise in IgG	Rubella IgM-pos. or significant rise in IgG	Maternal infection neither confirmed nor ruled out prior to delivery
Woman infected?	No	Yes	Unknown
Need to follow baby?	No	Yes—see Attachment A	Yes—see Attachment A

### Situation 3: Infants with CRS

In cases of suspect or confirmed CRS in an infant, contact the infection prevention staff in any facility in which the infant was seen, as well as care providers of the mother and the infant and review the following recommendations with them:

1. **Immediately place all suspect cases of CRS on Contact Precautions.** Infants with CRS shed virus in their urine and nasopharyngeal secretions and can remain infectious for 1 year or more after birth. Both the American Academy of Pediatrics in the *Red Book* and the Centers for Disease Control and Prevention (CDC) in the *CDC Guidelines for Isolation and Precautions in Hospitals* recommend Contact Precautions.
2. **Place all suspect cases of rubella on Droplet Precautions** during their infectious period. The infectious period for rubella is from 7 days before until 7 days after rash onset.
3. **Identify all high-risk patients and staff exposed** to the CRS and/or rubella case(s). Pregnant women and immunosuppressed individuals should be referred to their healthcare providers to determine if they are immune.
4. **Pregnancy and Immune Globulin.** Routine use of IG for postexposure prophylaxis is not recommended, even for susceptible pregnant women, because IG does not guarantee prevention of fetal infection. The only time IG may be considered is when infection occurs early in pregnancy and termination is not an option.
5. **Identify all other susceptible exposed patients and staff at the facility.** Healthcare providers of exposed infants should be notified. If a baby with CRS has been in a nursery where visitors and other family members have spent significant amounts of time, the immunity of those exposed to the baby should be evaluated. Proof of immunity is defined below:

PROOF OF IMMUNITY TO RUBELLA <sup>1</sup>	
<ul style="list-style-type: none"> <li>• Documentation of rubella vaccination on or after the first birthday.</li> <li>• Serologic proof of immunity.<sup>2</sup></li> </ul>	
<sup>1</sup> Remember, persons born outside the US (without written proof of immunity) are more likely to be susceptible, especially if they have been in the US for only a short time. <sup>2</sup> Documented <b>serologic evidence of immunity is the only acceptable proof of immunity for pregnant women.</b>	

6. **Notify healthcare providers of all exposed patients.**
7. **Immunize all susceptible patients and staff.** Live-virus rubella vaccine given after exposure has not been demonstrated to prevent illness, but theoretically could prevent illness if administered within 3 days of exposure. All susceptibles who are  $\geq 12$  months old (and for whom it is not contraindicated) should receive rubella vaccine given as the combined formulation of measles, mumps, rubella (MMR) vaccine.

Previous administration of human anti-Rho(D) immune globulin (RhoGam) does not generally interfere with an immune response to rubella vaccine. However, women who have received anti-Rho immune globulin should be serologically tested 6–8 weeks after vaccination to assure that seroconversion occurred. If other antibody-containing blood products are needed for other reasons, they should be administered at least 2 weeks before and deferred for up to 11 months after administration of MMR vaccine.

8. **Exclude susceptible staff.** Unlike measles, vaccinating immediately postexposure does not prevent an individual from acquiring rubella. Therefore, all susceptible individuals without proof of immunity, including those just vaccinated, can become infectious and must be excluded on

days 7 through 21 postexposure. They may return on the 22<sup>nd</sup> day. If additional cases occur, the exclusion period may need to be extended.

9. **Isolate susceptible patients and suspect/confirmed cases.** Susceptible patients  $\geq 12$  months old should be vaccinated and placed on Droplet Precautions for days 7–21 after exposure. They may be taken off precautions on the 22<sup>nd</sup> day. All suspect and confirmed cases should be placed on Droplet Precautions during their infectious period. The infectious period for rubella is 7 days before until 7 days after rash onset.
10. **Collect specimens for diagnostic testing on infants with suspect CRS and their mothers.**
11. **Conduct surveillance** for two incubation periods (46 days) after the last exposure in the facility, and report all suspect cases of rubella to IDPH (800) 362-2736.
12. **Take the opportunity to review the facility's policy on post-partum immunization of susceptible women.** Birthing facilities should be encouraged to adopt a policy of routine post-partum vaccination.

#### D. Preventive Measures

Vaccination, including routine childhood vaccination, catch-up vaccination of adolescents, and targeted vaccination of high-risk adult groups (such as international travelers and adults born outside the US), is the best preventive measure. Workers born outside the United States are a potentially susceptible population in which outbreaks may occur after importation of the virus from areas where rubella is endemic. Vaccinating against rubella in workplaces is a strategy to reach this susceptible population and can be a critical step in eliminating indigenous rubella.

The continuing occurrence of rubella among women of childbearing age indicates the need to continue vaccination of susceptible women in this age group. The absence of evidence of vaccine teratogenicity suggests that the practice is safe. Vaccination of susceptible women of childbearing age should:

- be part of routine general medical and gynecological outpatient care;
- take place in all family-planning settings; and
- be provided routinely before discharge from any hospital, birthing center, or other medical facility, unless a specific contraindication exists. (*Note:* Previous administration of human anti-Rho(D) immune globulin (RhoGam) does not generally interfere with an immune response to rubella vaccine. However, women who have received anti-Rho immune globulin should be serologically tested 6–8 weeks after vaccination to assure that seroconversion occurred.)

#### Rubella Vaccination of women of childbearing age:

Women who are pregnant or who intend to become pregnant within 4 weeks should not receive live rubella or MMR vaccine. The Advisory Committee on Immunization Practices (ACIP) recommends that vaccine providers ask a woman if she is pregnant or likely to become pregnant in the next 4 weeks. Those who are pregnant or intend to become pregnant should not be vaccinated. All other women should be vaccinated after being informed of the theoretical risks of vaccination during pregnancy and the importance of not becoming pregnant during the 4 weeks following vaccination. ACIP does not recommend routine pregnancy screening of women before rubella vaccination.

Please refer to the most current versions of the ACIP statement on measles, rubella, and mumps (listed under References, below), IDPH's Immunization Guidelines, and IDPH's Iowa's Vaccine for Children Program Eligibility Criteria for details about MMR vaccine, the recommended schedule, who should and shouldn't get the vaccine, and who is eligible to receive state-supplied vaccine. These, as well as other relevant resources, are available through the IDPH Clearinghouse at (319) 398-5133 or visit: [healthclearinghouse.drugfreeinfo.org/cart.php?target=category&category\\_id=295](http://healthclearinghouse.drugfreeinfo.org/cart.php?target=category&category_id=295)



## 4) ADDITIONAL INFORMATION

The Council of State and Territorial Epidemiologists (CSTE) surveillance case definitions for Rubella can be found at: [www.cdc.gov/osels/ph\\_surveillance/nndss/phs/infdis.htm#top](http://www.cdc.gov/osels/ph_surveillance/nndss/phs/infdis.htm#top)

CSTE case definitions should not affect the investigation or reporting of a case that fulfills the criteria in this chapter. (CSTE case definitions are used by the state health department and the CDC to maintain uniform standards for national reporting.)

## References

- Advisory Committee on Immunization Practices. Measles, Mumps, and Rubella Vaccine Use and Strategies for Elimination of Measles, Rubella, and Congenital Syndrome and Control of Mumps, May 22, 1998.
- American Academy of Pediatrics. *Red Book 2006: Report of the Committee on Infectious Diseases, 27<sup>th</sup> Edition*. Illinois, American Academy of Pediatrics, 2006.
- CDC. Immunization of Healthcare Workers. Recommendations of the Advisory Committee on Immunization Practices (ACIP) and the Hospital Infection Control Practices Advisory Committee (HICPAC). *MMWR*. 1997; 46:RR-18.
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- CDC, Epidemiology and Prevention of Vaccine Preventable Diseases 9<sup>th</sup> Edition (Pink Book) January 2006 [www.cdc.gov/vaccines/pubs/pinkbook/downloads/rubella.pdf](http://www.cdc.gov/vaccines/pubs/pinkbook/downloads/rubella.pdf)

## Resources

CDC Disease Surveillance Manual: [www.cdc.gov/vaccines/pubs/surv-manual/chpt14-rubella.html](http://www.cdc.gov/vaccines/pubs/surv-manual/chpt14-rubella.html)